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QUALITY OF CARE IN THE ARIZONA LONG-TERM CARE SYSTEM (ALTCS): A STUDY OF QUALITY INDICATORS AMONG NURSING HOME RESIDENTS

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Introduction

The Arizona Long-Term Care System (ALTCS) is part of the state of Arizona's capitated Medicaid program, the Arizona Health Care Cost Containment System (AHCCCS). ALTCS provides acute and long-term care services for approximately 18,000 Arizona beneficiaries meeting financial and medical/functional eligibility criteria. Beneficiaries include both the elderly and physically disabled (EPD) and the mentally retarded/ developmentally disabled (MR/DD).

The system is different from traditional fee-for-service Medicaid programs. For the EPD beneficiaries, it capitates entities, referred to as program contractors, in each county. These entities are the two largest Arizona counties, rural Arizona counties who elect to be program contractors, and private sector entities. Services include most of the acute care services provided under a traditional Medicaid program,[1] nursing home care, and home and community-based (HCB) services. HCB services covered include home health care, homemaker services, personal care, adult day health, hospice, respite care, attendant care (including family member attendant care), transportation, and home delivered meals.[2]

The Arizona Department of Economic Security (DES) receives federal funds through the Arizona Health Care Cost Containment System Administration (AHCCCSA) to support MR/DD beneficiaries. Their covered services include those listed above plus habilitation and day-care services.

Because of the innovative nature of the program, the Health Care Financing Administration (HCFA) has funded an evaluation[3] of the program that includes an examination of the quality of care delivered. The quality of care study has two components, both of which compare care in Arizona to care of a comparable cohort in New Mexico. The first component investigates the incidence of various conditions that are thought to be connected with lower quality of care in nursing homes. The second component is an analysis of new admissions' discharge experience in the program.[4] This paper describes the

results of the Indicator Study, which focuses on incidence of events thought to be associated with lower quality of care.

Methodology

The central question in the study is whether the system of care provided in Arizona's managed care program seems to result in lower quality of care, controlling for patient characteristics. The incidence of indicator conditions thought to be associated with lower quality is taken to reflect quality of care. Below we review the reasons for selection of the indicator conditions, data collection activities, and analysis techniques to be employed.

Selection of Indicator Conditions

Selected conditions are compared in a sample of ALTCS nursing home residents and a sample of Medicaid nursing home residents in New Mexico. The conditions are: incidence, frequency, and duration of decubitus ulcers; incidence and frequency of falls and fractures; incidence of patient fever, physician notification of patient fever, and physician response to the notification; use of catheters; provision of and/or offer to provide influenza (flu) vaccine; and use of psychotropic drugs.

Decubitus ulcers represent a serious problem facing many nursing home residents. The recovery time and likelihood of a positive outcome depend on how quickly the ulcer is recognized and treated. Estimates from the 1977 National Nursing Home Survey (NNHS) indicate that the prevalence of decubitus ulcers is approximately 2.6% among nursing home residents.[5] Spector et al. found that about 20% of newly-admitted nursing home patients had decubitus ulcers at the time of admission to the nursing home.[6] Because so many of the factors associated with decubitus ulcers are factors over which the nursing home staff has some control and because detection and prompt treatment is relatively straightforward and can generally be done within the nursing home

environment, the incidence of decubitus ulcers has frequently been used as a measure of the quality of nursing home care. We used several measures to assess care for decubitus ulcers: the fraction of the sample population with one or more decubitus ulcers during the year, the number of decubitus ulcers per person among those with a decubitus ulcer, and the number of days during the year that a patient was afflicted with a decubitus ulcer. We also separately examined the incidence, frequency, and duration of nursing home acquired decubitus ulcers.

Falls occur about once a year in almost half of all nursing home patients.[7] Although a high incidence of falls among nursing home residents may reflect inadequate care and insufficient patient supervision, the absence of falls among nursing home patients may also reflect poorer quality of care if the low incidence is due to overuse of restraints and failure to encourage patients in their efforts at mobility. We examined three measures of falls in our nursing home sample: the fraction of nursing home residents who experience one or more falls during the study period, the number of falls per person, and the incidence of fractures among the selected nursing home population.

Clinically significant fever (greater than 101°), a common occurrence among nursing home patients, has been reported to occur between 1.5 to more than four times for every thousand resident care days.[8,9] There is variability both in the time between recognition and response and in the type of action taken in response to fever by providers. We examined the incidence of fever among the study population, documented the number of episodes of fever during the study period, and assessed the frequency of nursing home personnel attempts to notify the physician within 24 hours of fever onset and the frequency of physician response when notified.

Urinary incontinence is one of the most prevalent health problems facing elderly Americans. Approximately nine percent of the elderly living at home and 36% to 62% of nursing home patients suffer from urinary incontinence.[10] There is evidence that incontinence among the elderly can be reduced through behavioral interventions.[11] However, these interventions also require a

large initial commitment of personnel time. Although use of indwelling catheters is less time consuming, it "is the most important antecedent to nursing-home-acquired urinary tract infection."[12] We examine the fraction of the population that experienced at least one incident of catheterization during the year, the number of catheterizations per patient, and the duration of catheterization. We also separately examined the incidence, frequency and duration of nursing home administered catheters.

Because it is considered good clinical practice and is recommended by the Centers for Disease Control that all patients over 65 who do not have a specific contraindication should receive influenza vaccine, we examined the differences between Arizona and New Mexico in the fraction of patients receiving or being offered influenza vaccine.

Although estimated prevalence rates for mental disorders among nursing home residents range from 30% to 85%[13,14] and psychotropic drugs are often prescribed for patients with mental disorders, they may also be prescribed when there is no clinical indication of need. Patients may be easier to manage, but have decreased physical functioning and an overall reduction in the quality of life. Beardsley et al. found that more than one-fifth of the patients having orders for psychotropic drugs did not have a documented medical disorder.[15] In our analysis, we examined the incidence and frequency of psychotropic drug use for nursing home patients in Arizona and New Mexico.

Data Collection

Data on each individual patient included in the study population were abstracted from nursing home medical records using a data collection plan specially designed for this study. A pilot test of the draft instrument was conducted in six facilities where ten patient records were coded for up to 36 months of care. As a result of the pilot test, the instrument, the sampling methodology, and the field procedures were refined.

The sampling frame was composed of all EPD beneficiaries in the New Mexico Medicaid or Arizona ALTCS program in the same nursing home for 12 months over the period January 1, 1990 through December 31, 1991 in selected urban and rural areas. Random samples of individuals were chosen in each area. Areas in Arizona were Maricopa County (urban), Pima County (urban), and Yavapai County (rural) where 150, 200, and 150 people respectively were selected for the primary sample. The comparison samples in New Mexico were composed of 200 people in the primary sample for Bernalillo County (urban) and 150 people in the primary sample from a combination of Santa Fe and San Miguel counties (rural). Reserve samples, to be used if data from the primary sample were not available, were chosen for each facility that was to be visited.

Four full-time abstractors and a part-time abstractor led by a full-time field work project manager comprised the abstraction team. Twenty nursing homes in New Mexico and fifty-one in Arizona were visited. Only five of the 350 records coded in New Mexico and eight of the 500 records coded in Arizona were from the reserve sample. Thus, 99% of the primary sample was successfully coded.

Analysis Techniques

Analysis techniques to be used include both description and multivariate techniques. Descriptive data for each state are first examined. Chi-square tests for categorical variables and t-tests for continuous variables are employed to test statistical significance. Multivariate models using logistic regression for dependent variables that are dichotomous categorical variables and ordinary least squares regression for continuous variables are constructed.

Results

Comparison of the Sample Populations

Demographic and Other Characteristics

Table 1 shows that the demographic characteristics (age, sex, ethnicity, and marital status) are very similar in the two groups being studied. The biggest difference between the two samples is in the ethnic distribution. In Arizona, only 11% were Hispanics as compared to 46% in New Mexico. Whites-not-of-Hispanic origin were 81% of the Arizona sample and 48% of the New Mexico group. Native Americans, Blacks, and unknowns in the two states made up about the same percentage of the sample.

With respect to their disposition at the end of the coding period, a larger percentage of persons in Arizona died than in New Mexico (21% versus 15%). The disposition category, other (13% in Arizona and 14% in New Mexico), is made up primarily of people who were in the hospital or transferred to another long-term care facility. It also includes a small number of people (nine in Arizona and seven in New Mexico) who returned to their homes.

Arizona sample members had significantly more "do-not-resuscitate" orders than did those in New Mexico (73% versus 63%), and a significantly larger percentage of people in New Mexico than in Arizona received or were offered influenza vaccine (83% versus 75%). A smaller, but not statistically significant, number of people were hospitalized in Arizona than in New Mexico (31% versus 34%). The mean number of hospital days was significantly greater in New Mexico than in Arizona (7.2 days versus 6.0 days). The median number of hospital days for those hospitalized was six in New Mexico and five in Arizona.

Drug use was significantly larger in Arizona than in New Mexico for routine drugs, "as needed" (PRN) drugs prescribed, and PRN drugs received. The largest number of routine prescriptions per resident in both states was seven, with nine percent of the New Mexico group and seven percent of the

Table 1

CHARACTERISTICS OF EPD NURSING HOME RESIDENTS
WITH STAYS OF MORE THAN ONE YEAR

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
Demographic characteristics			
Age (%)			χ^2=3.30(p=.35)
0 - 64	9.0	12.9	
65 - 74	12.8	12.0	
75 - 84	31.4	30.9	
85+	46.8	44.3	
Sex (%)			χ^2=0.71(p=.40)
Male	26.8	29.4	
Female	73.2	70.6	
Ethnicity (%)			χ^2=26.12(p<.01)
Hispanic	11.3	46.0	
White	80.9	48.1	
Other	7.8	6.0	
Marital Status (%)			χ^2=4.57(p=.10)
Married	16.1	19.1	
Widowed	59.2	51.6	
Other	24.7	29.3	
Disposition (%)			χ^2=5.54(p=.06)
Still in facility	65.5	70.9	
Died	21.2	14.9	
Other	13.2	14.3	
Do-not-resuscitate (%)			χ^2=9.25(p<.01)
Yes	72.7	62.8	
No	27.3	37.2	
Offered Influenza Vaccine (%)			χ^2=6.64(p=.01)
Yes	75.4	82.8	
No	24.7	17.2	
Hospital Use			
Having one or more hospital stays (%)			χ^2=0.87(p=.35)
Yes	30.4	33.4	
No	69.6	66.6	
Among those with a hospital stay			
Mean number of days	5.98	7.22	t=-2.53(p=.01)

Table 1 (Concluded)

CHARACTERISTICS OF EPD NURSING HOME RESIDENTS
WITH STAYS OF MORE THAN ONE YEAR

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
Medications			
Mean Routine	5.14	4.51	t= 2.94(p<.01)
Mean PRN Prescribed	3.63	2.42	t= 8.66(p<.01)
Mean PRN Received	2.23	1.73	t= 2.90(p<.01)
Mean Psychotropic	0.76	0.79	t=-0.33(p=.74)

Arizona group having seven prescriptions. Five percent of both groups had no routine drugs prescribed. There is no significant difference in the mean number of psychotropic drugs prescribed although the rate is slightly larger in New Mexico (0.76% as compared with 0.79%). When data are examined for the percentage of people with any psychotropic drug prescribed, the rate is also slightly larger in Arizona (41% versus 40%), but the difference is not statistically significantly.

Mental and Physical Functioning

The samples were not significantly different with respect to cognitive status at either the beginning or the end of the coding period (see Table 2). The New Mexico group had a slightly higher, but not statistically significant, level of cognitive status impairment at both the beginning and ending assessments. At the beginning of the assessment period, a larger percentage of the residents' cognitive status was described as alert in Arizona than in New Mexico (38% versus 35%) and a smaller percentage was described as disoriented (22% versus 24%). At the ending assessment, a larger percentage was described as alert in Arizona than in New Mexico (29% versus 26%) and a smaller percentage was described as disoriented or comatose (31% versus 36%). The mean change in cognitive status was greater in New Mexico than in Arizona but the difference in the change in cognitive status between the two states was not statistically significant.

Note that measuring the change in average cognitive score is not a clear-cut procedure. Cognitive status was scored on a four-point scale with one being alert and four being comatose. By calculating the mean change in cognitive status, we assume that intervals between each cognitive status are equal. While this may not be true from a clinical or statistical standpoint, because our purpose was to compare the Arizona and New Mexico samples, we believe comparing the data in this way is nevertheless useful.

Besides recording patients' cognitive ability scores, we also recorded blood pressure and weight during the study period. Average blood pressure at

Table 2

COGNITIVE STATUS, PHYSICAL ASSESSMENT, AND MOBILITY ASSISTANCE DEVICES FOR EPD NURSING HOME RESIDENTS WITH STAYS OF MORE THAN ONE YEAR

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
Cognitive status			
Mean number of days between assessments	362	366	
Beginning (%)			χ^2=2.24(p=.52)*
Alert	38.4	34.8	
Partially deficient	39.4	41.4	
Disoriented	21.5	23.6	
Comatose	0.8	0.3	
Ending (%)			χ^2=2.08(p=.56)
Alert	29.1	26.4	
Partially deficient	40.0	38.1	
Disoriented	27.1	31.0	
Comatose	3.8	4.6	
Mean Change	0.21	0.25	t =-0.97(p=.33)
Physical Assessment			
Mean number of days between assessments			
Blood Pressure	365	365	
Weight	358	352	
Beginning			
Mean systolic	128	125	t =2.61(p=.01)
Mean diastolic	70	69	t =0.51(p=.61)
Weight	129	120	t =3.85(p<.01)
Outside ideal weight (%)			χ^2=7.80(p=.01)
Yes	56.4	66.3	
No	43.6	33.7	
Ending			
Mean systolic	124	122	t =1.87(p=.06)
Mean diastolic	68	68	t =0.74(p=.46)
Weight	127	117	t =4.42(p<.01)
Outside ideal weight (%)			χ^2=7.64(p=.01)
Yes	59.3	69.2	
No	40.7	30.8	

Table 2 (Concluded)

COGNITIVE STATUS, PHYSICAL ASSESSMENT, AND MOBILITY ASSISTANCE DEVICES FOR EPD NURSING HOME RESIDENTS WITH STAYS OF MORE THAN ONE YEAR

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
Mobility assisstance devices needed			
Mean number of days between assessments	362	365	
Beginning			
Wheelchair (%)			χ^2=23.11(p<.01)
No	21.4	36.4	
Yes	78.6	63.6	
Cane (%)			χ^2=5.40(p=.02)
No	97.4	94.2	
Yes	2.6	5.8	
Walker (%)			χ^2=1.69(p=.19)
No	84.9	81.5	
Yes	15.1	18.5	
Ending			
Wheelchair (%)			χ^2=12.22(p<.01)
No	21.4	32.1	
Yes	78.6	67.9	
Cane (%)			χ^2=0.00(p=.99)
No	96.0	96.0	
Yes	4.0	4.1	
Walker (%)			χ^2=0.38(p=.54)
No	87.3	85.8	
Yes	12.7	14.2	

* Twenty-five percent of the cells have expected counts less than five. Chi-squared may not be a valid test.

the beginning assessment was 128/70 in Arizona and 125/69 in New Mexico. At the ending assessment, the average blood pressure was 124/68 in Arizona and 122/68 in New Mexico. Systolic blood pressure was higher in Arizona than in New Mexico at both the beginning and ending assessments. The difference, however, is very small. Diastolic readings were not significantly different between the states.

At the first recording, the Arizona group had an average weight of 129 pounds and the New Mexico group had an average weight of 120 pounds. Weight decreased to 127 pounds in Arizona and to 117 pounds in New Mexico by the ending assessment. At the beginning assessment, 56% of the Arizona sample and 66% of the New Mexico sample were outside their ideal body weight. At the ending assessment, 59% of the Arizona sample and 69% of the New Mexico sample were outside their ideal body weight.

Table 2 also shows the percentage of the samples who use mobility assistance devices. The percentage of those using wheelchairs was significantly greater in Arizona (79% in Arizona versus 64% in New Mexico at the beginning assessment and 79% in Arizona versus 68% in New Mexico at the ending assessment). Cane usage was significantly less in Arizona at the beginning assessment (three percent versus five percent), but not at the ending assessment (four percent in both places). Walker use was greater in New Mexico at both assessments, although the differences are not statistically significant. At the beginning assessment, the New Mexico rate was 19% as compared to 15% in Arizona. At the ending assessments, the rates were 14% and 13% respectively.

Bladder and Bowel Continence

Table 3 shows information on bladder and bowel continence. There is a significant difference in bladder continence between the states with the Arizona sample having a smaller percentage continent or usually continent (36% in Arizona versus 44% in New Mexico). The ending bladder continence assessment also indicates more impairment in Arizona although the differences

Table 3

EPD NURSING HOME RESIDENTS WITH STAYS OF MORE THAN ONE YEAR:
BLADDER AND BOWEL CONTINENCE

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
Mean number of days between assessments	362	365	
Beginning			
Bladder Continence (%)			χ^2=21.99(p<.01)
Continent	34.8	37.1	
Usually Continent	1.4	6.9	
Occasionally	9.0	5.4	
Frequently	8.6	6.6	
Incontinent	46.8	44.6	
Bowel Continence (%)			χ^2=8.37(p=.08)
Continent	44.0	46.9	
Usually Continent	2.6	5.7	
Occasionally	4.8	3.1	
Frequently	6.0	4.3	
Incontinent	42.6	40.0	
Ending			
Bladder Continence (%)			χ^2=9.52(p=.05)
Continent	23.9	27.0	
Usually Continent	3.4	7.5	
Occasionally	6.4	6.3	
Frequently	8.6	6.6	
Incontinent	57.7	52.6	
Bowel Continence (%)			χ^2=8.79(p=.07)
Continent	32.6	36.1	
Usually Continent	3.2	6.9	
Occasionally	5.0	4.6	
Frequently	6.6	4.9	
Incontinent	52.6	47.6	
Mean Change			
Bladder Continence	0.42	0.35	t =0.80(p=.42)
Bowel Continence	0.43	0.36	t =0.83(p=.41)

are not statistically significant. Distributions are also not statistically significant in the two states with respect to bowel continence although the Arizona sample shows a higher level of disability. Neither the change in bladder continence nor the change in bowel continence from the initial assessment to ending assessment is statistically significant although it is greater in Arizona than in New Mexico.

Activities of Daily Living

Table 4 examines beginning and ending measurements of activities of daily living (ADLs) using the categories defined in HCFA's Minimum Data Set (MDS). The MDS categories for coding disabilities on each ADL are: independent, supervision, limited assistance, extensive assistance, and total dependence. Seven ADLs are coded: mobility, transfers, feeding, dressing, bathing, toileting, and personal hygiene.

Arizona exhibited more severe limitations than New Mexico in the mobility, feeding, and toileting ADLs in the beginning assessments. There were also significant differences between the states in mobility, transfers, bathing, toileting, and personal hygiene in the ending assessments. In all cases, the Arizona population appears to exhibit more severe ADL limitations. There were no significant differences in the rates of ADL deterioration between the states.

Indicator Events

For each of the seven indicator events identified above, we first compare the incidence rates between the Arizona and New Mexico samples. Then we conduct a multivariate analysis to examine whether the state is significant, controlling for other factors that may affect the incidence.

Table 4

EPD NURSING HOME RESIDENTS WITH STAYS OF MORE THAN ONE YEAR:
ACTIVITIES OF DAILY LIVING

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
Mean number of days between assessments	362	365	
Beginning			
Mobility (%)			χ^2=15.25(p<.01)
Independent	49.3	45.4	
Supervision	4.4	9.5	
Limited Assistance	9.0	13.0	
Extensive Assistance	11.6	12.4	
Total Dependence	25.7	19.7	
Transfers (%)			χ^2=3.55(p=.47)
Independent	29.6	31.4	
Supervision	4.0	6.3	
Limited Assistance	16.4	17.0	
Extensive Assistance	19.8	18.4	
Total Dependence	30.2	26.8	
Feeding (%)			χ^2=10.33(p=.04)
Independent	40.1	43.7	
Supervision	27.1	30.3	
Limited Assistance	9.6	6.6	
Extensive Assistance	9.0	4.3	
Total Dependence	14.2	15.1	
Dressing (%)			χ^2=6.05(p=.20)
Independent	12.6	12.0	
Supervision	8.0	11.1	
Limited Assistance	16.2	17.1	
Extensive Assistance	20.2	23.7	
Total Dependence	43.0	36.0	
Bathing (%)			χ^2=8.12(p=.09)
Independent	3.2	6.6	
Supervision	6.6	9.2	
Limited Assistance	16.8	17.0	
Extensive Assistance	25.8	24.1	
Total Dependence	47.6	43.1	
Toileting (%)			χ^2=21.15(p<.01)
Independent	24.4	19.8	
Supervision	6.4	9.5	
Limited Assistance	8.2	14.3	
Extensive Assistance	14.2	20.1	
Total Dependence	46.8	36.4	
Personal Hygiene (%)			χ^2=5.86(p=.21)
Independent	14.8	15.8	
Supervision	6.2	9.7	
Limited Assistance	19.0	16.3	
Extensive Assistance	17.0	19.5	
Total Dependence	42.9	38.7	

Table 4 (Continued)

EPD NURSING HOME RESIDENTS WITH STAYS OF MORE THAN ONE YEAR:
ACTIVITIES OF DAILY LIVING

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
Ending			
Mobility (%)			χ^2=9.65(p=.05)
Independent	40.0	36.2	
Supervision	3.8	8.3	
Limited Assistance	8.6	10.6	
Extensive Assistance	14.3	14.7	
Total Dependence	33.3	30.2	
Transfers (%)			χ^2=10.76(p=.03)
Independent	21.4	23.4	
Supervision	2.8	6.6	
Limited Assistance	15.4	10.9	
Extensive Assistance	22.2	20.0	
Total Dependence	38.2	39.1	
Feeding (%)			χ^2=6.41(p=.17)
Independent	28.0	31.5	
Supervision	26.6	28.7	
Limited Assistance	12.4	7.5	
Extensive Assistance	7.4	6.3	
Total Dependence	25.6	26.1	
Dressing (%)			χ^2=8.88(p=.06)
Independent	9.0	8.3	
Supervision	4.4	9.4	
Limited Assistance	12.8	13.1	
Extensive Assistance	22.4	20.3	
Total Dependence	51.4	48.9	
Bathing (%)			χ^2=11.35(p=.02)
Independent	2.4	5.1	
Supervision	4.0	8.0	
Limited Assistance	10.8	10.6	
Extensive Assistance	25.2	23.7	
Total Dependence	57.6	52.6	
Toileting (%)			χ^2=18.44(p<.01)
Independent	18.2	14.9	
Supervision	3.6	8.3	
Limited Assistance	7.4	12.3	
Extensive Assistance	14.8	17.2	
Total Dependence	55.9	47.3	
Personal Hygiene (%)			χ^2=11.54(p=.02)
Independent	11.4	11.2	
Supervision	3.2	7.7	
Limited Assistance	14.8	12.3	
Extensive Assistance	17.6	20.9	
Total Dependence	53.0	47.9	

Table 4 (Concluded)

EPD NURSING HOME RESIDENTS WITH STAYS OF MORE THAN ONE YEAR:
ACTIVITIES OF DAILY LIVING

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
Mean Change			
Mobility	0.37	0.43	t =-0.65(p=.52)
Transfers	0.36	0.42	t =-0.80(p=.42)
Feeding	0.46	0.50	t =-0.44(p=.66)
Dressing	0.30	0.31	t =-0.26(p=.80)
Bathing	0.24	0.22	t = 0.21(p=.84)
Toileting	0.34	0.29	t = 0.70(p=.48)
Personal Hygiene	0.31	0.30	t = 0.10(p=.92)

Decubitus Ulcers

Table 5 compares the incidence of decubitus ulcers between the Arizona and New Mexico samples. Approximately 42% of those in Arizona experienced one or more decubitus ulcers during the year compared to 27% of those in New Mexico. If we look only at decubitus ulcers acquired by patients while in the nursing home, nearly 40% of those in Arizona experienced one or more decubitus ulcers compared to 26% of those in New Mexico.

The data presented in Table 5 indicate that Arizona nursing home residents are more likely to experience a decubitus ulcer than their New Mexico counterparts. Furthermore, the Arizona nursing home resident who experiences one or more decubiti has a larger number of decubitus ulcers, a higher level of severity per ulcer, and a longer time until healed. Findings are similar when the analysis is restricted to any decubiti acquired at the nursing home.

There are a number of patient risk factors that may be associated with the development of decubitus ulcers, such as mobility and bladder control, that could vary between the Arizona and New Mexico samples. To control for this, we include these factors as independent variables in our logistic regression model. The dependent variable in the model takes the value of one if the patient experienced one or more nursing home acquired decubitus ulcers during the year and zero if the patient did not experience a nursing home acquired decubitus ulcer during the year.

The independent (control) variables in the model are the state, rural/urban location of the nursing home, patient ethnicity, the number of ADLs in which the patient required assistance, the initial assessment of the patient's mobility level, and the assessment of the patient's ability to control his/her bladder. Urban is defined as Maricopa and Pima counties in Arizona and Bernalillo County in New Mexico. All other counties are considered rural. ADLs measured are personal hygiene, mobility, bathing, eating, dressing, feeding, and transferring. Assistance is categorized as limited assistance, extensive assistance, or totally dependent.

Table 5

EPD NURSING HOME RESIDENTS WITH STAYS OF MORE THAN ONE YEAR:
DECUBITUS ULCERS

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
All patients with decubitus ulcers			
Have one or more decubitus ulcers (%)			χ^2=20.84(p<.01)
Yes	41.8	26.6	
No	58.2	73.4	
For those with a decubitus ulcer			
Mean number of cases	2.64	2.39	t =1.06(p=.29)
Mean number of cases with daily treatment	2.46	2.29	t =0.73(p=.46)
Mean number of decubiti days	76.20	54.17	t =1.36(p=.18)
Mean highest stage	2.41	2.20	t =1.64(p=.10)
Mean number of cases healed	1.94	1.73	t =0.94(p=.35)
Patients with nursing home acquired decubitus ulcers			
Have one or more decubitus ulcers (%)			χ^2=17.44(p<.01)
Yes	39.8	26.0	
No	60.2	74.0	
For those with a decubitus ulcer			
Mean number of cases	2.62	2.15	t =1.95(p=.05)
Mean number of cases with daily treatment	2.44	2.07	t =1.57(p=.12)
Mean number of decubiti days	77.48	54.87	t =1.46(p=.15)
Mean highest stage	2.36	2.12	t =1.89(p=.06)
Mean number of cases healed	1.93	1.62	t =1.43(p=.16)

The results are presented in Table 6. The coefficients and the marginal probability are shown and the statistical significance is indicated. Those who are totally dependent in mobility compared to those independent and the number of ADLs recorded for which the patient needs assistance have a significant effect on the number of nursing-home acquired decubiti. Those who are totally dependent in mobility have a 15% higher probability of having a decubitus ulcer than those who are independent. For each additional ADL deficiency reported, the probability of having a decubitus ulcer increases five percent.

The results indicate that Arizona nursing home residents had a 13% higher probability of having a nursing home acquired decubiti than their New Mexico counterparts. Controlling for the other variables included in the model slightly reduces the magnitude of the effect of state on the probability of a nursing home resident acquiring a decubitus ulcer.

Falls

Table 7 shows the frequency of falls among the nursing home patients studied. Fifty percent of the sample of Arizona nursing home patients experience one or more falls during the 12-month study period compared to 52% in New Mexico. The difference between the two samples is not statistically significant. Among those patients who experience at least one fall during the year, the mean number of falls is identical in the two states, 3.4.

Table 8 presents the results of a logistic regression examining risk factors that may be related to patient falls. It omits people who are comatose at the beginning assessment from the population. The control variables are state, facility location (rural/urban), patient ethnicity, the number of ADLs in which the patient required assistance, patient ability to transfer, patient use of mobility assistance devices (wheelchair, cane, or walker), and patient cognitive functioning.

Table 6

FACTORS AFFECTING THE PROBABILITY OF ACQUIRING
A DECUBITUS ULCER IN THE NURSING HOME

Independent Variables	Coefficient	Marginal Probability
State		
New Mexico	—	—
Arizona	.58**	.13
Urbanization		
Urban	—	—
Rural	-.26	-.06
Ethnicity		
Non-Hispanic	—	—
Hispanic	-.01	-.00
Number of ADLs for which person needs assistance	-.22**	.05
Mobility		
Independent	—	—
Supervision	.12	.03
Limited assistance	.16	.04
Extensive assistance	.25	.06
Totally dependent	.68*	.15
Bladder Control		
Continent	—	—
Usually continent	-.19	-.04
Occasionally incontinent	-.01	.00
Frequently incontinent	-.08	-.02
Incontinent	.04	.01
Intercept	-2.23**	
Number in Sample	815	
-2 Log Likelihood ratio	942.13	

Note: Marginal probability is calculated by multiplying the coefficient by the percentage of the sample where the dependent variable = 1 times the percentage of the sample where the dependent variable = 0
Odds ratio is $e^{coefficient}$

— Indicates reference group
* Statistically significant at the .05 level, two-tailed test
** Statistically significant at the .01 level, two-tailed test

Table 7

EPD NURSING HOME RESIDENTS WITH STAYS OF MORE THAN ONE YEAR:
FALLS, FRACTURES, AND FEVERS

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
Falls			
Have one or more falls (%)			χ^2=0.71(p=.40)
Yes	49.5	52.4	
No	50.5	47.6	
For those with a fall			
Mean number of falls	3.37	3.37	t =0.02(p=.99
Fractures			
Have one or more fractures (%)			χ^2=0.33(p=.57)
Yes	7.6	6.6	
No	92.4	93.4	
For those with a fracture			
Mean number of fractures	1.08	1.04	t =0.54(p=.59)
Mean number of days until medical evaluation	0.74	1.13	t =-0.81(p=.42)
Fevers			
Have one or more (%)			χ^2=12.76(p<.01)
Yes	40.8	28.9	
No	59.2	71.1	
For those with a fever			
Mean highest temperature	102.63	102.33	t = 2.06(p=.04)
MD notified for the first fever (%)			χ^2=1.06(p=.30)
Yes	76.9	82.0	
No	23.2	18.0	
For those with fevers where MD was notified for the first fever, MD note was recorded for the first fever (%)			χ^2=0.70(p=.792)
Yes	98.1	91.0	
No	1.9	9.0	

Table 8

FACTORS AFFECTING THE PROBABILITY OF
HAVING A FALL IN THE NURSING HOME
(Comatose Patients are Omitted)

Independent Variables	Coefficient	Marginal Probability
State		
New Mexico	—	—
Arizona	.20	.05
Urbanization		
Urban	—	—
Rural	-.05	-.01
Ethnicity		
Non-Hispanic	—	—
Hispanic	.48*	.12
Number of ADLs for which person needs assistance	-.02	.01
Transfer		
Independent	—	—
Supervision	.54	.14
Limited assistance	-.29	-.07
Extensive assistance	-.03	-.01
Totally dependent	-.95*	-.24
Wheelchair	—	—
No	-.20	-.05
Cane	—	—
No	.37	.09
Walker	—	—
No	.23	.06
Cognitive Status		
Alert	—	—
Partially deficient	.11	.03
Disoriented	-.26	-.07
Intercept	.31	
Number in Sample	800	
-2 Log Likelihood ratio	1041.44	

Note: Marginal probability is calculated by multiplying the coefficient by the percentage of the sample where the dependent variable = 1 times the percentage of the sample where the dependent variable = 0
Odds ratio is $e^{coefficient}$

— Indicates reference group
* Statistically significant at the .05 level, two-tailed test
** Statistically significant at the .01 level, two-tailed test

After controlling for these variables, we continue to find no statistically significant difference in the frequency of falls between Arizona and New Mexico. However, individuals who are totally dependent in transferring are 24% less likely to experience a fall than those who are more independent in transferring. The ADL limitations of a patient, the use of mobility assistance devices, and the need for supervision, limited or extensive assistance in transferring are not significantly associated with occurrence of a fall. Interestingly, Hispanics are significantly more at risk of experiencing a fall than non-Hispanics, although it is not clear why this would be true. The marginal probability of experiencing a fall is 12% more for Hispanics compared to non-Hispanics. It may be that this control variable is capturing other health differences between Hispanics and non-Hispanics that are not reflected in the other independent variables.

Fractures

Table 7 shows the fraction of the sample population in Arizona and New Mexico experiencing one or more fractures. About eight percent of the Arizona sample and seven percent of the New Mexico sample experience one or more fractures during the study period. The difference between the two patient populations is not statistically significant.

For those who had fractures, the mean number of fractures was slightly more than one in both states. Again the difference between the states is not statistically significant. The time (mean number of days) until medical evaluation is shorter in Arizona than in New Mexico, less than one day in Arizona and slightly more than one day in New Mexico. The difference is not statistically significant. Because such a small fraction of our sample population in each state experienced a fracture, we did not perform multivariate analysis for this indicator event.

Fevers

Table 7 shows that approximately 41% of the Arizona sample and 29% of the New Mexico sample experience one or more fevers during the 12 month study period. The higher fever rate for Arizona was statistically significant. Among those experiencing at least one fever during the study period, the mean highest temperature was 102.6 for the Arizona sample and 102.3 for the New Mexico sample. The higher temperature for the Arizona sample population is also statistically significant.

To examine the nursing home response to patient fevers, we compare the percentage of times that a physician was notified when a patient experienced a fever in Arizona and New Mexico. For those patients experiencing more than one fever during the study period, we examine physician notification for the first fever in the study period. In 77% of the Arizona cases and 82% of the New Mexico cases, a physician was notified within 24 hours when a patient experienced a fever. In 98% of the fever cases in Arizona, documentation of a physician response was noted in the patient's medical record. This is true for 91% of fever cases where the physician was notified in New Mexico. While the number of doctors' notes recorded in Arizona is larger than in New Mexico, the actual number of cases lacking documentation of response is quite small.

Based on the literature, we identified a number of variables that have been associated with the development of fevers among nursing home patients. Patient mobility and cognitive status, insertion of a catheter, occurrence of a decubitus ulcer, and patient ADL limitations have been reported to be associated with the development of fevers. The results of the logistic regression examining the association of these factors with patient development of a fever are shown in Table 9.

The results indicate that patient mobility and overall ADL limitations are positively associated with the development of fevers. Patients who require extensive assistance or are totally dependent in mobility have a 13% higher probability of developing fever than patients who are independent or required limited assistance in mobility. Patients who had a catheter inserted

Table 9

FACTORS AFFECTING THE PROBABILITY OF
AT LEAST ONE FEVER IN THE NURSING HOME

Independent Variables	Coefficient	Marginal Probability
State		
New Mexico	—	—
Arizona	.59**	.14
Urbanization		
Urban	—	—
Rural	.37*	.09
Ethnicity		
Non-Hispanic	—	—
Hispanic	.27	.06
Number of ADLs for which person needs assistance	.12*	.03
Cognitive Status		
Alert or partially deficient	—	—
Disoriented or comatose	.17	.04
Mobility		
Independent or needing limited assistance	—	—
Needing extensive assistance or totally dependent	.55**	.13
Catheter		
Yes	.63**	.15
Decubitus Ulcers		
Yes	.38*	.09
Intercept	-2.21**	
Number in Sample	811	
-2 Log Likelihood ratio	961.73	

Note: Marginal probability is calculated by multiplying the coefficient by the percentage of the sample where the dependent variable = 1 times the percentage of the sample where the dependent variable = 0
Odds ratio is $e^{coefficient}$

— Indicates reference group
* Statistically significant at the .05 level, two-tailed test
** Statistically significant at the .01 level, two-tailed test

during the study period and those who had at least one decubitus ulcer during the study period have higher probabilities of developing a fever. Having a catheter increased the probability of a fever by 15%. Those with at least one decubitus ulcer had a nine percent higher probability of a fever.

The number of ADLs for which a patient requires assistance is also found to be positively associated with the development of a fever. For each additional limitation requiring assistance, the probability of having a fever increases three percent. Patients who reside in facilities located in rural areas have a higher probability of experiencing a fever than those in urban areas. The increase in marginal probability for rural residents is nine percent. Ethnicity is not significantly related to the probability of developing a fever.

The results in Table 9 indicate that even after controlling for many of the factors associated with fever development, Arizona nursing home residents are 14% more likely to have a documented fever than their New Mexico counterparts. This is slightly higher than the unadjusted marginal probability of experiencing a fever of 12% for Arizona as compared to New Mexico nursing home residents found in Table 7.

Indwelling Urinary Catheters

Urinary catheters may be appropriately used to manage urinary incontinence but they also can result in adverse outcomes such as urinary tract infections and sepsis. Thus, it is important for good quality nursing home care that use of catheters be carefully monitored.

Table 10 shows that 22% of our sample of Arizona nursing home patients had catheters at least once during the study period compared to 16% of New Mexico nursing home patients. For those with catheters inserted, the number of insertions is similar in both states, 1.12 in Arizona as compared to 1.15 in New Mexico. When we restrict our sample to patients who had a catheter inserted in the nursing home, the percentages within the samples drop

Table 10

EPD NURSING HOME RESIDENTS WITH STAYS OF MORE THAN ONE YEAR:
INDWELLING URINARY CATHETER USE

	Arizona (N=500)	New Mexico (N=350)	χ^2 or t (probability)
All patients with catheterization			
Have one or more (%)			χ^2=4.90(p=.03)
Yes	21.8	15.7	
No	78.2	84.3	
For those with a catheter			
Mean number of catheter insertions during abstraction period	1.12	1.15	t =-0.39(p=.70)
Patients with nursing home inserted catheters			
Have one or more (%)			χ^2=10.42(p<.01)
Yes	8.2	2.9	
No	91.8	97.1	
For those with a catheter			
Mean number of nursing home catheters inserted	1.13	1.22	t =0.61(p=.54)
Catheterization was preceded by bladder training attempts (%)			χ^2=0.46(p=.50)
Yes	26.1	36.4	
No	73.9	63.6	
Mean number of days per nursing home inserted catheter	78.98	42.80	t =1.18(p=.25)
Mean number of days with nursing home inserted catheter per person	89.74	47.56	t =1.22(p=.23)

considerably. Eight percent of Arizona nursing home patients have one or more nursing home inserted catheters compared to three percent of New Mexico nursing home patients. The differences in the number of catheter inserted, bladder training attempts, and days catheters were inserted were not statistically significant at the five percent level of significance.

Table 11 shows the results of our logistic regression, which includes independent variables that measure factors commonly associated with catheter insertion in the nursing home. Independent variables in the model are state, urbanization, ethnicity, number of ADLs for which the person needs assistance, level of incontinence, and cognitive status. The results indicate that neither a patient's level of bladder control nor his/her cognitive status is significantly related to the probability of catheterization. However, our overall measure of ADL limitations and state is significantly related to the probability of catheterization. For each additional ADL limitation the probability of having a catheter increases two percent. Nursing home residents in Arizona are seven percent more likely to have a nursing home inserted catheter after controlling for bladder continence, cognitive status, and ADL limitations.

Injection of Influenza Vaccine and Psychotropic Drug Use

Because of the morbidity and mortality associated with influenza and the high degree of safety of the influenza vaccine, it should be offered every autumn to nursing home residents. We did not conduct a multivariate analyses on this measure because we could not identify any accessible control variables that we believe are appropriate to control for in such a model. Thus, the simple frequency is examined. This comparison shows a significant difference between the states with 83% of the New Mexico sample and 75% of the Arizona sample being offered or having received influenza vaccine. (See Table 1.)

Lower use of psychotropic drugs is generally considered to be an indicator of higher quality care. Psychotropic drug use (which earlier in this paper was reported to be not significantly different between the states,

Table 11

FACTORS AFFECTING THE PROBABILITY OF HAVING A NURSING HOME INITIATED INDWELLING URINARY CATHETER

Independent Variables	Coefficient	Marginal Probability
State		
New Mexico	—	—
Arizona	.70*	.07
Urbanization		
Urban	—	—
Rural	.13	.01
Ethnicity		
Non-Hispanic	—	—
Hispanic	-.50	-.05
Number of ADLs for which person needs assistance	.23**	.02
Incontinence		
Continent	—	—
Occasionally incontinent	.22	.02
Frequently incontinent	-.13	-.01
Totally incontinent	-.24	-.02
Cognitive Status		
Alert	—	—
Partially deficient	-.26	-.03
Disoriented	-.20	-.02
Comatose	.17	.02
Intercept	-3.32	
Number in Sample	815	
-2 Log Likelihood ratio	538.57	

Note: Marginal probability is calculated by multiplying the coefficient by the percentage of the sample where the dependent variable = 1 times the percentage of the sample where the dependent variable = 0
Odds ratio is $e^{coefficient}$

— Indicates reference group
* Statistically significant at the .05 level, two-tailed test
** Statistically significant at the .01 level, two-tailed test

see Table 1) was analyzed in a multivariate model. Table 12 shows the results of this analysis. The independent variables in the model are state, urbanization, ethnicity, the number of ADLs for which the person needs assistance, and diagnosis of depression.[16]

The model results show that a diagnosis of depression and the number of ADLs for which assistance is needed have an impact on the probability of having a psychotropic drug prescribed. Those with a diagnosis of depression are 34% more likely to have a psychotropic drug prescribed than those not having such a diagnosis. For each additional ADL deficiency (i.e., ADL for which assistance is needed) the probability of having a psychotropic drug prescribed decreases four percent.

Discussion

The results of our quality of care analysis indicate that nursing home residents in the ALTCS program are more likely to experience a decubitus ulcer, a fever, or a catheter insertion than nursing home residents covered by New Mexico Medicaid. These findings do not change after controlling for patients' functional and cognitive status. ALTCS nursing home residents are also less likely to receive influenza vaccines than Medicaid nursing home residents in New Mexico. There are no significant differences between nursing home residents in ALTCS and those in New Mexico Medicaid with respect to the incidence of patient falls or fractures or in the use of psychotropic drugs.

These results suggest a somewhat lower quality of care for ALTCS nursing home residents than for Medicaid nursing home residents in New Mexico. However, we recognize that because the experimental design could not provide for subjects to be randomly assigned to treatments, that careful consideration must be given to the internal validity (bias) and external validity (generalizability) of the study.

With respect to internal validity, three points are important to discuss. First, although we attempted to control for differences between the

Table 12

FACTORS AFFECTING THE PROBABILITY OF HAVING
A PSYCHOTROPIC DRUG PRESCRIBED
ON A ROUTINE OR PRN BASIS

Independent Variables	Coefficient	Marginal Probability
State		
New Mexico	—	—
Arizona	-.13	-.01
Urbanization		
Urban	—	—
Rural	.27	.06
Ethnicity		
Non-Hispanic	—	—
Hispanic	-.18	-.04
Number of ADLs for which person needs assistance	-.17*	-.04
Depression Diagnosis		
No	—	—
Yes	1.39*	.34
Intercept	.29*	
Number in Sample	820	
-2 Log Likelihood ratio	1043.76	

Note: Marginal probability is calculated by multiplying the coefficient by the percentage of the sample where the dependent variable = 1 times the percentage of the sample where the dependent variable = 0
Odds ratio is $e^{coefficient}$

— Indicates reference group

* Statistically significant at the .05 level, two-tailed test

two samples with respect to patient health status and demographic characteristics, nevertheless there may be unmeasured differences between the two samples that were not captured in the model but which are related to the quality of care indicators studied. Examples include specific patient diagnoses and other patient characteristics that are directly related to a particular outcome measure (e.g., muscle strength in the case of falls, skin condition in the case of decubitus ulcers, etc.). We have no reason to believe that there are systematic differences between the samples in the two states for specific diagnoses or other patient characteristics. However, we could not specifically measure all possibly relevant patient characteristics and therefore could not control for all of them in our analysis.

A related point is the possibility that the patient health status and demographic characteristics we did measure and control for in the analysis were not able to fully capture the differences between the two samples. For example, our comparison of the two samples by functional status indicates that ALTCS nursing home residents are more dependent than the New Mexico nursing home residents. In our multivariate analyses we controlled for these overall functional differences by including the number of ADLs for which a patient required assistance. We also included the patient's functional status in specific areas that have been shown in the literature to be related to the indicator event (e.g., decrease in mobility and lack of bladder control are associated with increased rate of decubitus ulcers). We also recognize that other ways of measuring functioning ability and different scoring schemes for the dimensions might yield different results. However, we do believe our methods are appropriate and supported by empirical studies.

A second consideration is that the quality of care indicators we selected could not be exhaustive. We chose what we believe to be relevant and important quality indicators, but there are other measures of quality we did not investigate. For example, we did not measure patient satisfaction. Doing so would have involved in-person interviews with patients and their families and would have greatly increased the cost of the project and, for many of the patients, may not have resulted in meaningful measures of patient satisfaction. On the other hand, we acknowledge that comprehensive assessment

of quality of care must include the satisfaction of the program's beneficiaries.

Third, reliance on data from the patient medical record, as compared with direct patient assessment, could influence the results if there are differences in the quality of record-keeping between nursing homes in the two states. We measured the incidence of the indicator events by performing a historical review of each patient's nursing home record for a one-year period of time. We did not find differences that might have been expected if record-keeping in one state was systematically less compulsive than the other. For example, no difference was found between the states' rates for falls, for which record-keeping could be a problem. On the other hand, differences were found in the incidence of catheter insertions, a situation in which we would not have expected that record-keeping would affect the incidence rates. We therefore conclude that differences in record-keeping do not have a substantial impact on the findings and for the conditions studied represent a more than reasonable view of reality.

Thus, we believe that the study is therefore internally valid; that the differences found between states are not explained by bias in selecting the sample, selecting the conditions, or collecting the data.

External validity or generalizability is the second set of issues to consider. The study population selected may not be generalizable to all users of long-term care services. Our sample consisted of long-stay nursing home residents. If we designed a different study with a different sample (e.g., including both nursing home and HCBS patients, using a different time frame, or examining only patients from date of program entry) the results may have been different. While we believe we made an appropriate choice in defining the study population, we cannot be absolutely confident that similar results would apply to other subgroups of long-term care patients.

We also must consider the limitations of using New Mexico as the control group. We chose New Mexico because we believed that a carefully selected New Mexico sample would be the most comparable group we could find to represent a

traditional Medicaid nursing home population similar to the ALTCS nursing home population. However, Medicaid nursing home residents in New Mexico are not the only possible comparison group. Both Arizona and New Mexico may render a quality of care to Medicaid nursing home patients that is above the national average. Review of the literature suggests that the incidence of indicator conditions in both states is lower than is reported in the general population of nursing home patients. Thus, comparing ALTCS' performance to another state or a national sample might yield more encouraging results.

We also have no information on the pre-ALTCS incidence of the indicator conditions in the nursing home population. Arizona may have improved its quality of care for indigent patients considerably under the ALTCS program although it has not reached the level of New Mexico. Because a relatively short amount of time elapsed between the beginning of the ALTCS program and our quality of care review, it may also be that the ALTCS program did not have enough time to demonstrate its impact on the quality of care rendered. If this is true, a future comparison between ALTCS and New Mexico Medicaid might yield different results than those presented here.

It should also be acknowledged that although there are differences between the states in the systems for delivering care, the mechanism of facility payment for the individual nursing homes in Arizona and New Mexico are quite similar. In both states, facilities are paid on a per diem basis by class of facility. In the case of New Mexico, the payment is made directly by the state. In Arizona, a contractor who manages the long-term care eligibles' care pays the nursing home and the contractor is reimbursed by the state on a capitated basis. Consequently, differences between the two states in quality of care rendered to nursing home patients, while they may be attributable to the two systems of care, cannot be attributed to the facility payment method.

Although we believe that the results are generalizable and externally valid, we recognize that the caveats discussed must be considered seriously.

Given that the differences in quality of care that we observe are real and significant, the implications of the findings for developing a policy

strategy are nevertheless problematic. For example, differences in the quality of care rendered to Medicaid nursing home residents in the two states may be the result of differences in nursing home licensing and certification standards and enforcement between the two states or in the type of facilities with which the Medicaid program has contracts rather than differences in the organized system of care. We did review enforcement activities in the two states. Our review did not pinpoint any major differences in licensing and certification, to some extent because the standards are primarily federal standards. Thus, differences in licensing and certification are not likely to explain the differences found.

We believe that quality of care for patients receiving care under ALTCS is of paramount importance in assessing the usefulness of the new system. While this study found significantly lower quality of care on some quality indicators in ALTCS as compared with the New Mexico Medicaid program, we believe the results need to be interpreted cautiously. Although we believe the results are meaningful and valid, it should be acknowledged that the findings could have been influenced by the decisions about sample selection, by methods chosen to collect the data, by less than perfect quantification of the independent variables, and by the choice of quality indicators.

The lower quality of care found for certain indicators in ALTCS must also be balanced against the limited evidence that suggests the quality of care may be higher for the indicator conditions in both states. Lastly, the lack of data on the quality of care in Arizona pre-ALTCS should be taken into account; the short amount of time since the ALTCS program was implemented may not be sufficient for improvements in the quality of care to be measurable. Our findings are provocative but we believe further investigation is warranted before concluding that a capitated system for long-term care leads to lower quality of care.

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